



AUSTRALIAN  
**ENERGY**  
COUNCIL

RENEWABLES: STATUS AND  
INTEGRATION CHALLENGES

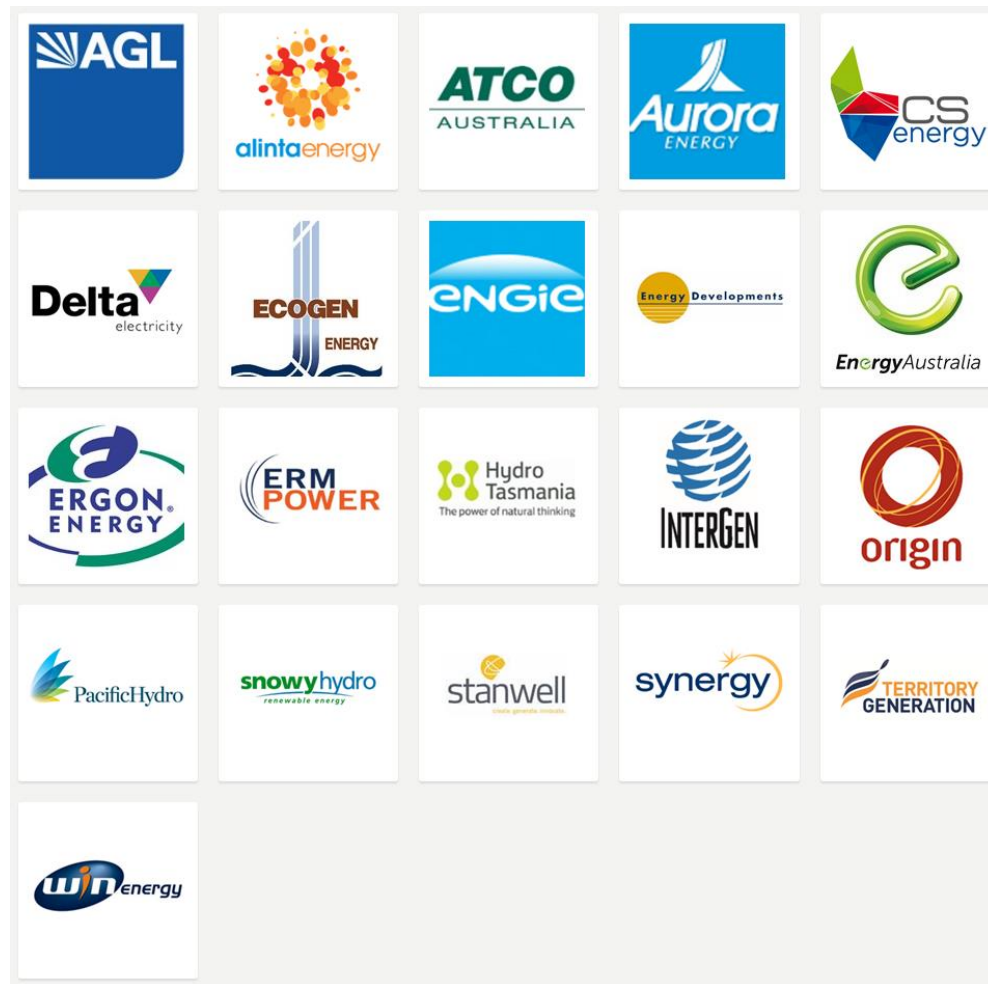
EMMA RICHARDSON, POLICY ADVISER  
MARCH 2017

# WHO IS THE AUSTRALIAN ENERGY COUNCIL?



The Australian Energy Council represents 21 major electricity and downstream natural gas businesses operating in competitive wholesale and retail energy markets.







These businesses collectively generate the overwhelming majority of electricity in Australia and sell gas and electricity to over 10 million homes and businesses.



Source: Australian Energy Council, <https://www.energycouncil.com.au/about/>

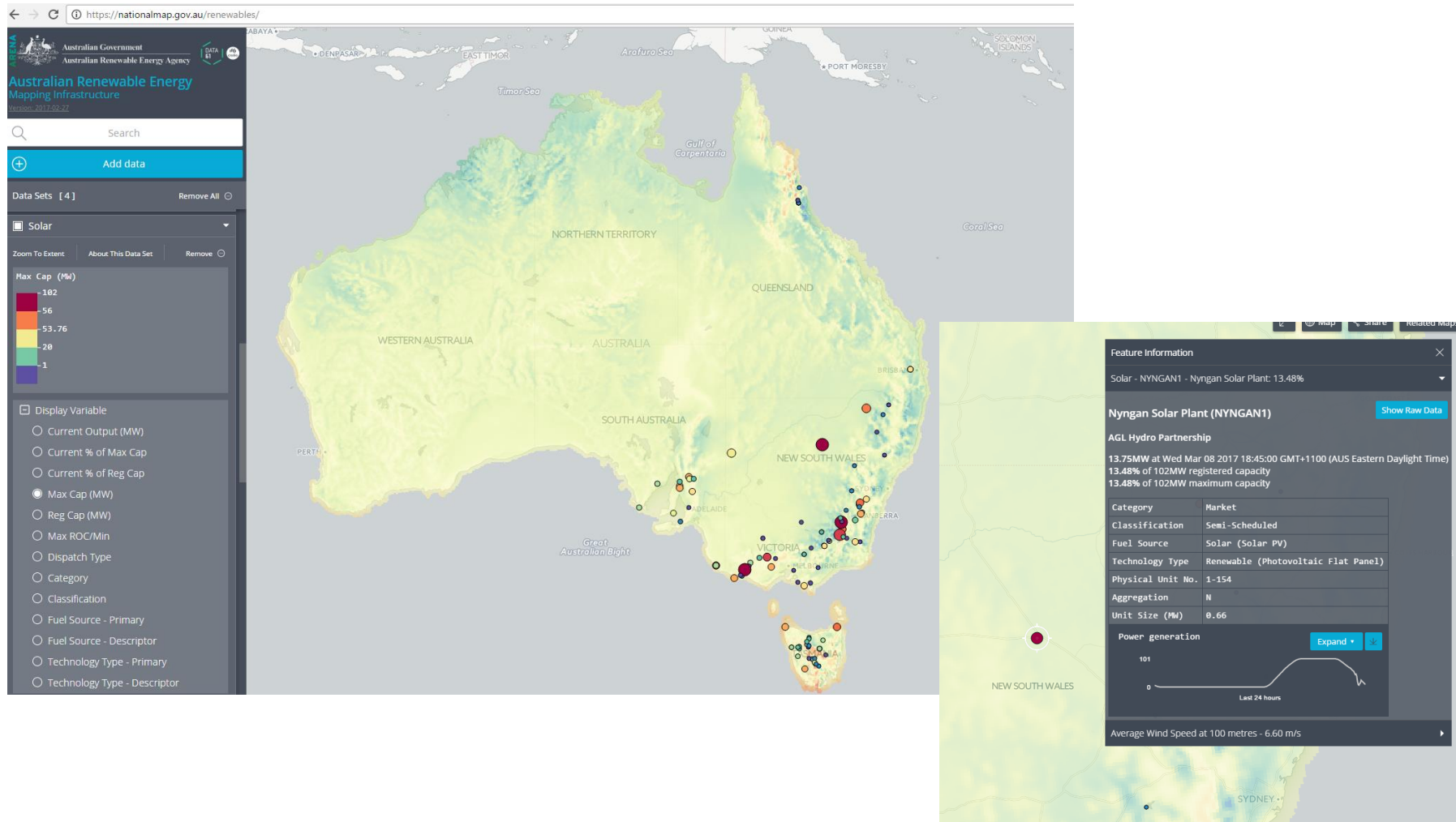
# RENEWABLE ENERGY IN AUSTRALIA

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	<b>Fuel</b>	<b>2016</b>		<b>Fuel</b>	<b>2016</b>
	Coal	75%		Wind	6%
	Gas	8%		Diesel	<1%
	Hydro	9%		Solar PV	2%

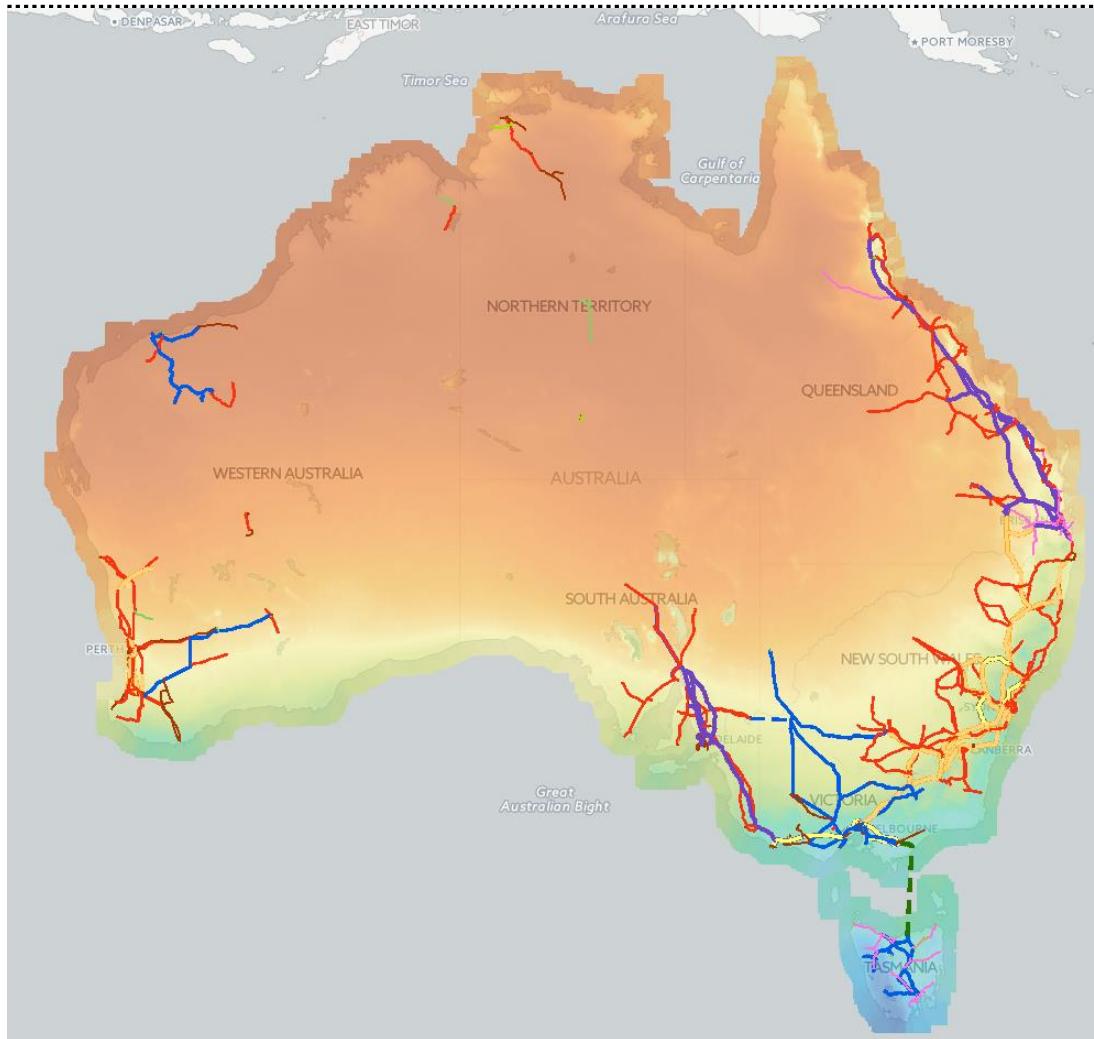
Source: NEM Review, 2017. Metered generation (as generated).

# RENEWABLES IN AUSTRALIA



Source: AREMI, interactive mapping tool. With solar, hydro and wind generation and wind resources added.

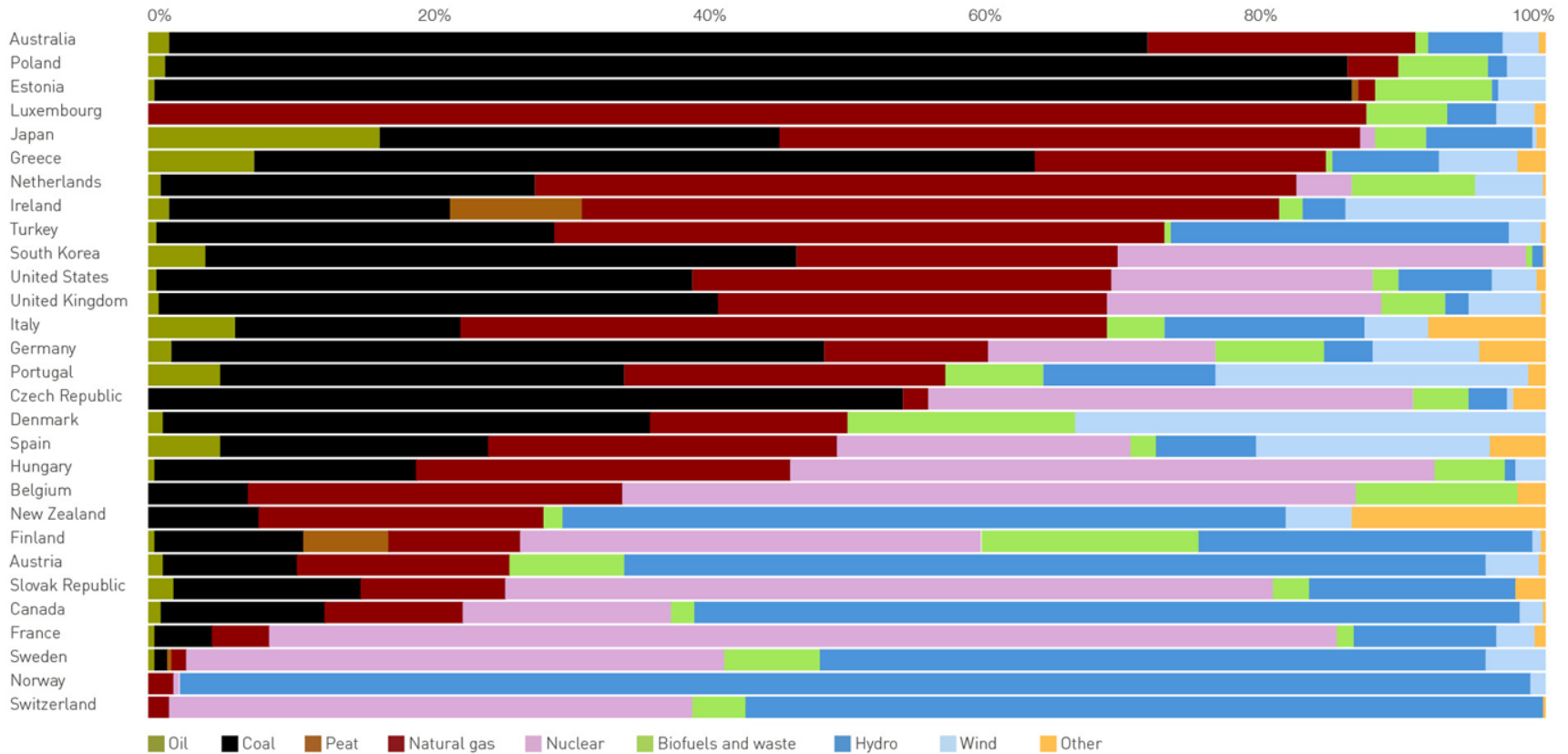
# AUSTRALIA'S SOLAR RESOURCES



Source: AREMI, interactive mapping tool. With annual solar resources and transmission lines added.

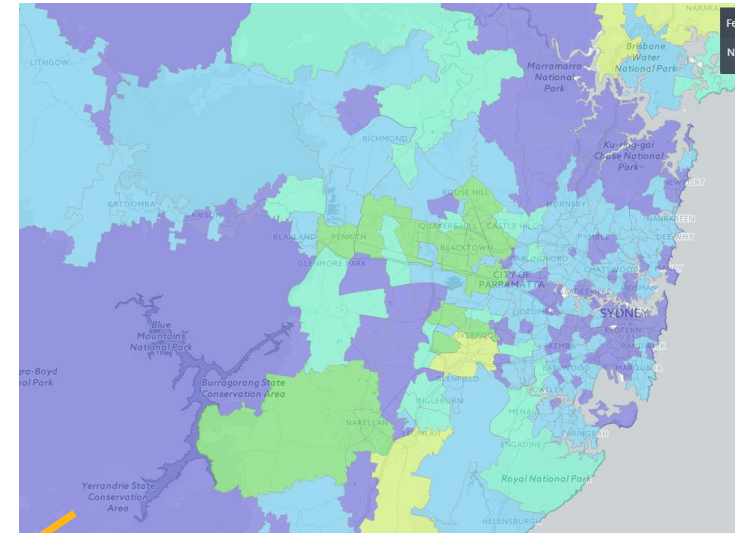
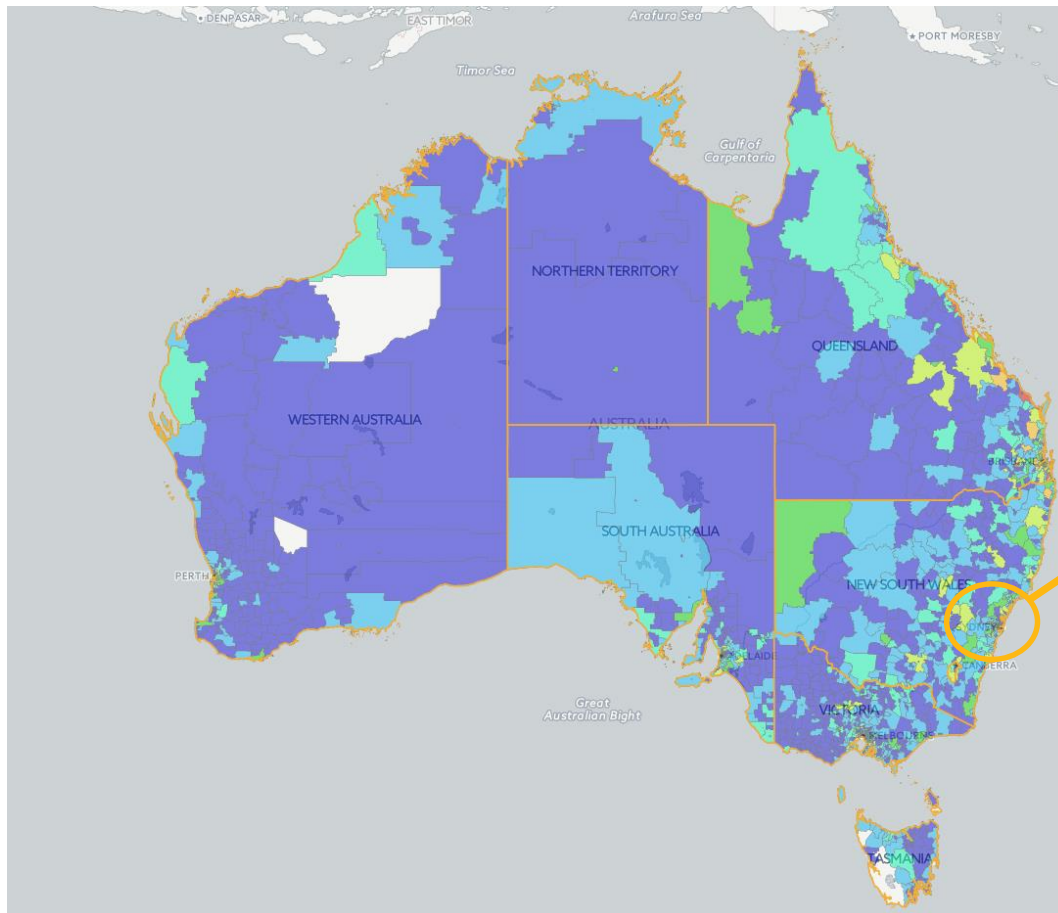
# ELECTRICITY GENERATION BY COUNTRY

## Electricity generation by proportion of energy type by country 2013



Source: IEA

# SOLAR PV INSTALLATIONS BY POSTCODE

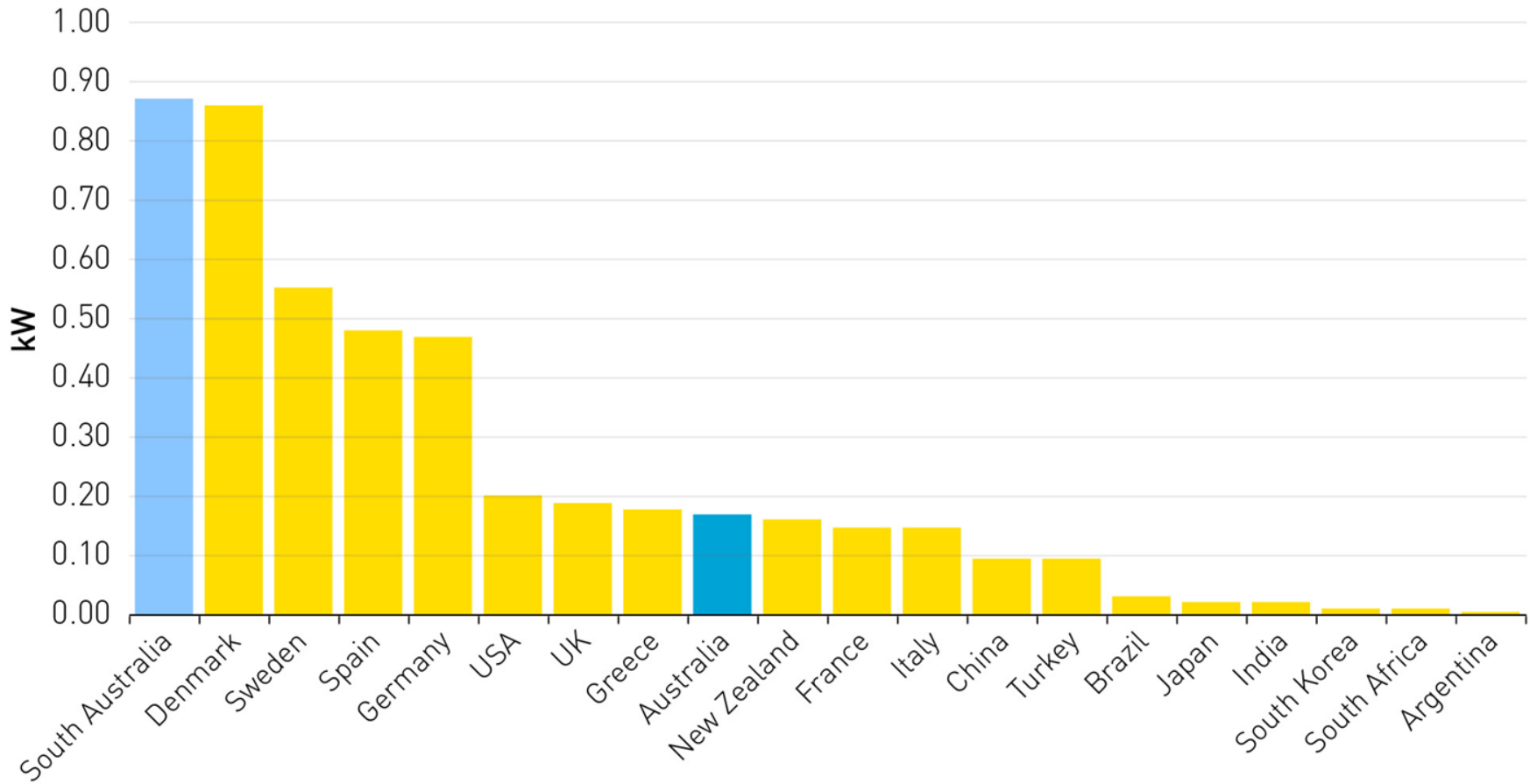


In the Greater Sydney region, solar PV is most common in the outer suburbs because:

- Fewer people rent.
- More detached houses with roof space.
- More mortgages: sensitivity to home improvement and living costs.

Source: AREMI, 2017, with solar PV installations added.

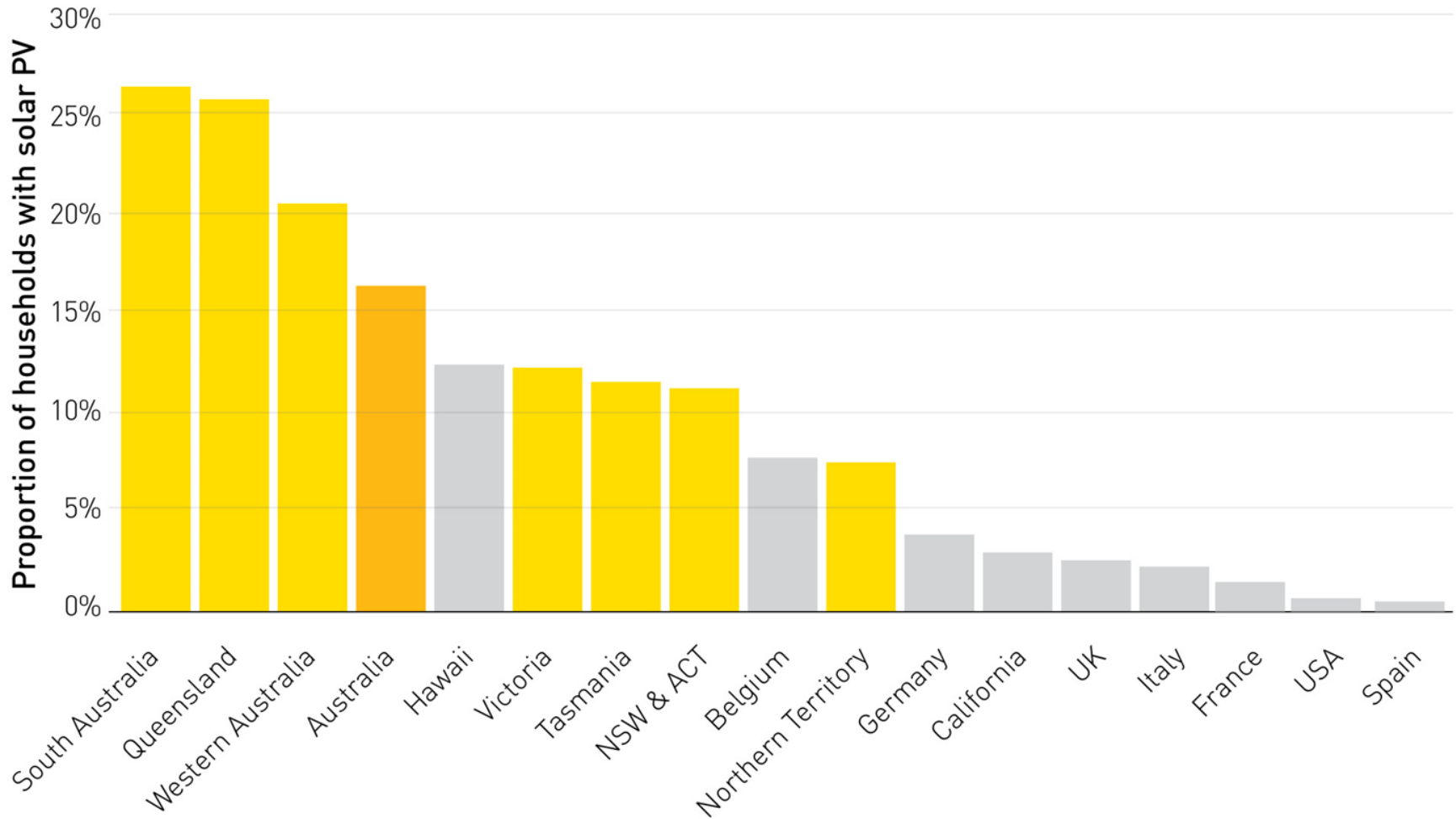
# WIND CAPACITY PER CAPITA



Source: World Bank, Global Wind Energy Council, EGA.

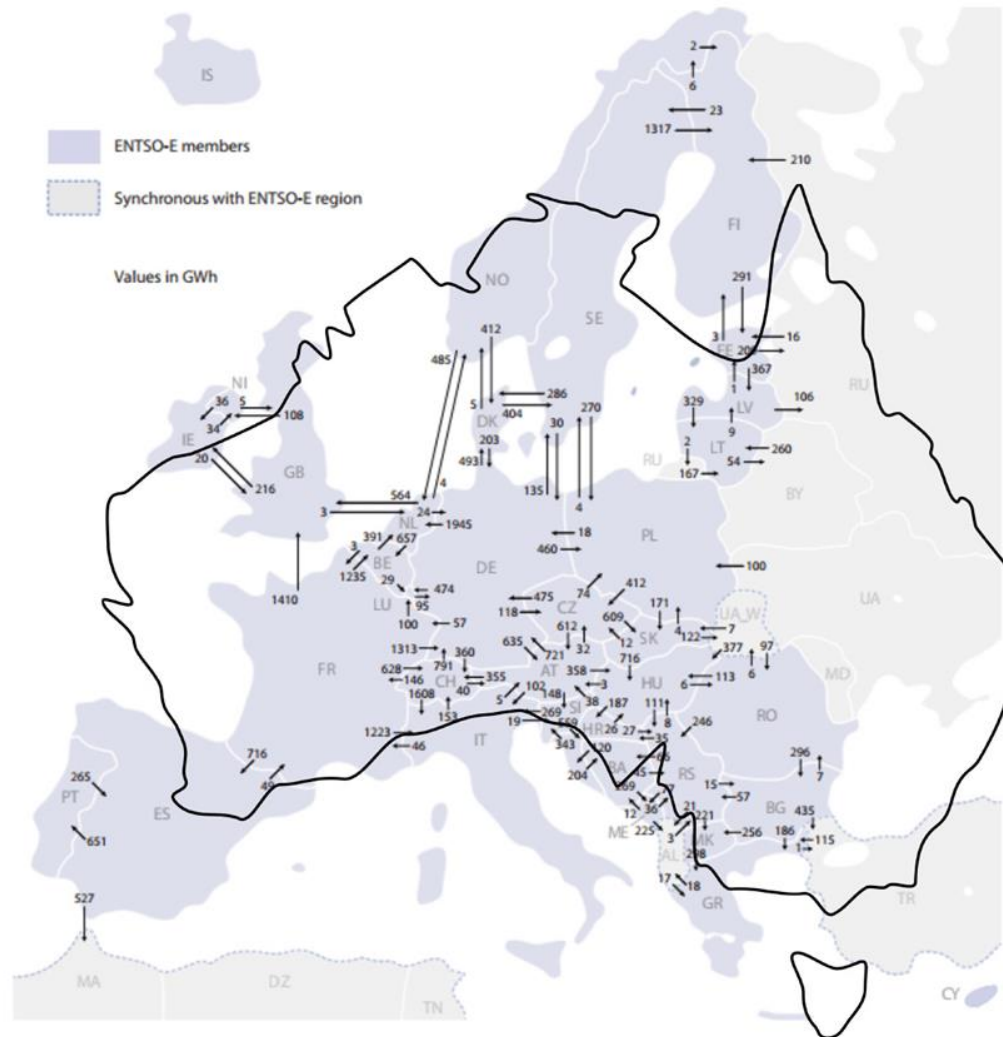


# ROOFTOP SOLAR PV PENETRATION

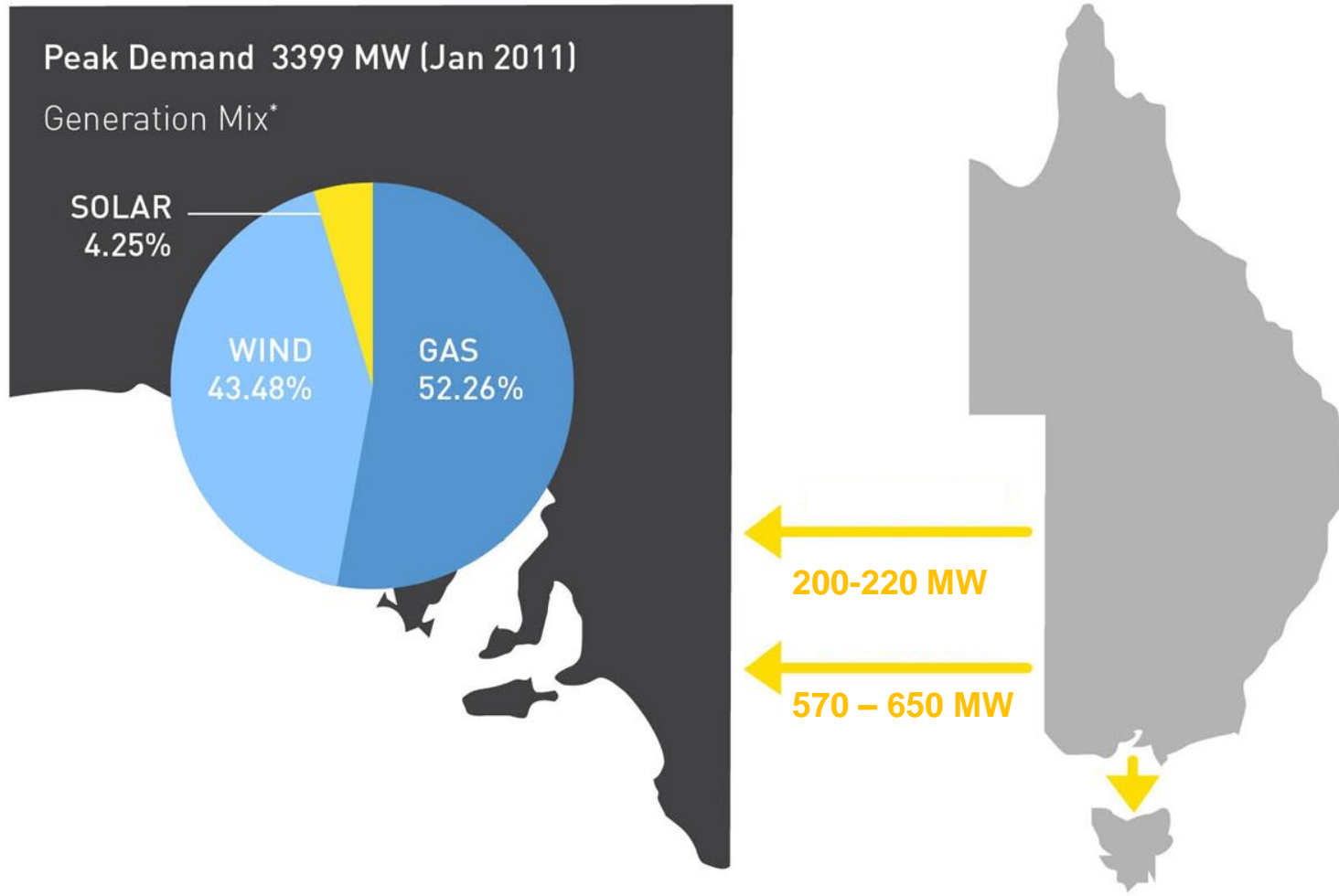


Source: Australian Energy Council

# AUSTRALIA'S GEOGRAPHIC CHALLENGE

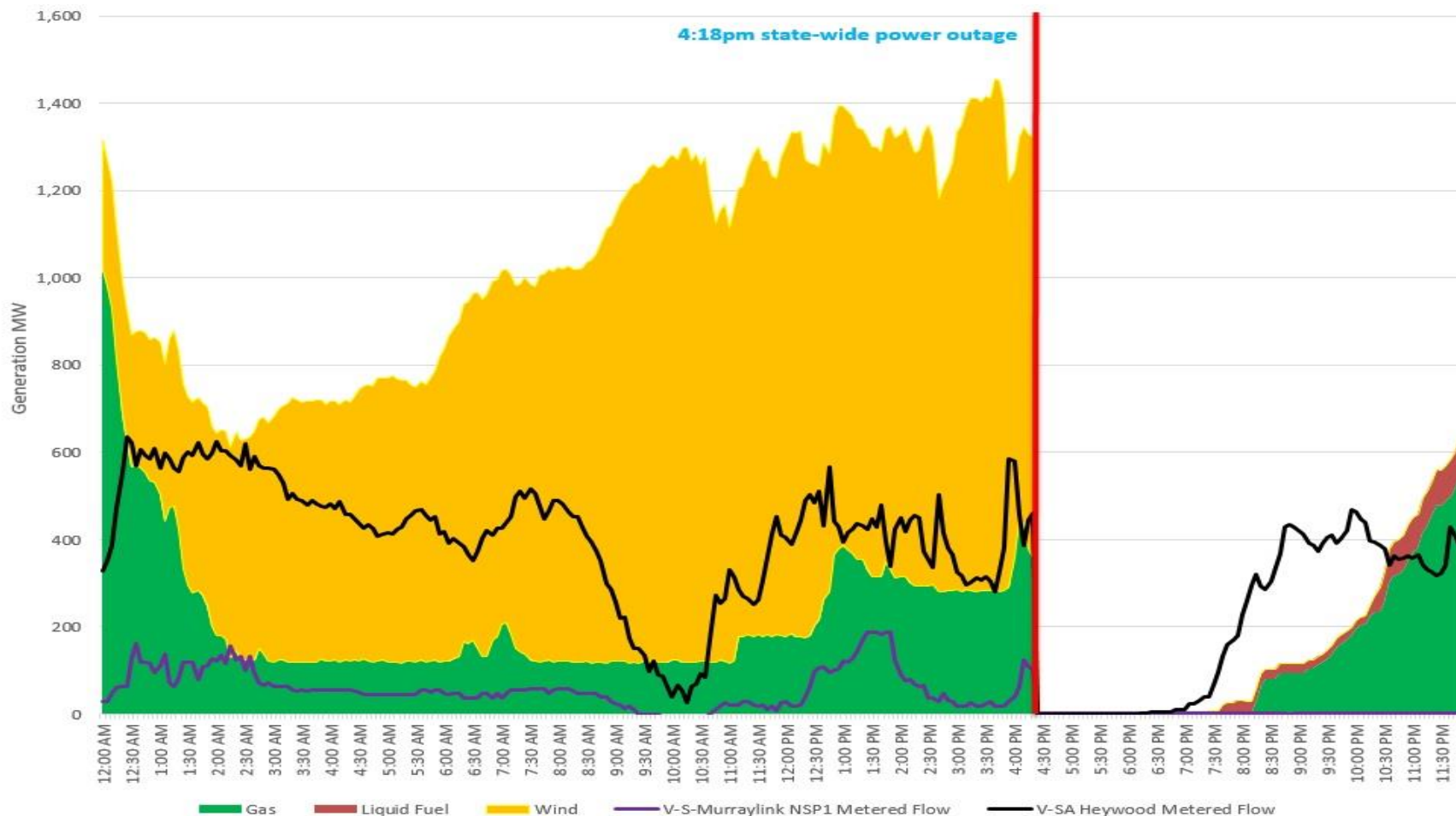


# SOUTH AUSTRALIAN (SA) GENERATION POST COAL



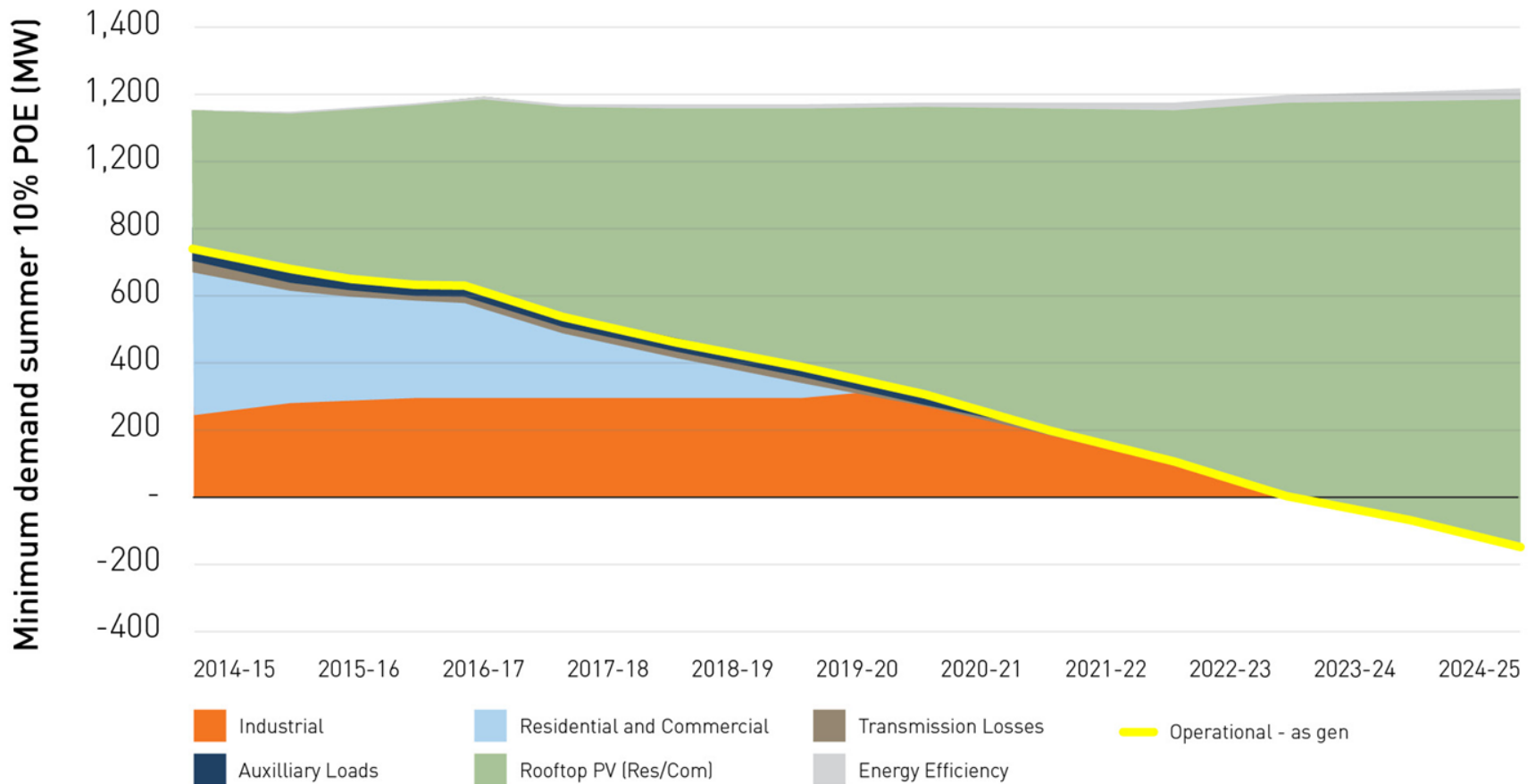
\* May – August 2016 | Source: NEM Review, AEMO

# SA GENERATION MIX AND INTERCONNECTOR FLOW



Source: NEM Review, market participant data

# SOUTH AUSTRALIAN MINIMUM SUMMER DEMAND



Source: AEMO, 2016

- Increased market volatility.
- Accelerated retirement of traditional generators leading to peak capacity concerns.
- Increased power quality risks during periods of low demand.
- Possibility that minimum demand could be met entirely by intermittent generation (e.g. rooftop solar generation) by as early as 2023.
- Reduced system responsiveness to sudden losses of generation.

## SOURCES

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Australian Energy Council, analysis published weekly.

<https://www.energycouncil.com.au/analysis/>

AREMI, interactive mapping tool.

<http://nationalmap.gov.au/renewables/>

Australian PV Institute, data animation and maps.

<http://pv-map.apvi.org.au/>

Australian Energy Market Operator (AEMO), energy supply and prices 24/7.

<https://www.aemo.com.au/>

US National Renewable Energy Laboratory (NREL), interactive maps.

<https://maps.nrel.gov/re-atlas/>



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